

The three species therefore form a gradational series, all extraordinarily alike externally, and merely differing in the sizes of their skulls.

Mr. Jackson's discovery of this interesting connecting-link in the genus is the more remarkable as *R. splendens* has been found both to the north of its habitat, in Abyssinia, and to the south, on and near Mt. Kilimanjaro, whence Mr. H. C. V. Hunter obtained four specimens in 1888, which he was good enough to present to the National Collection. These specimens are quite identical with Abyssinian examples.

It may just be mentioned, although probably of but little importance, that *R. annectens* has not the darker muzzle ordinarily present in *R. splendens*, that it has a paler tail, and that its bullæ appear to be proportionally rather smaller.

Specimens *b* and *c* are too young to be determined with absolute certainty, at least until the exact local ranges of *R. annectens* and *R. splendens* are known. They are remarkable for their very long, soft and silky hair, and their peculiar bluey-grey colour, utterly unlike the reddish-brown characteristic of the adult. In fact, without the skulls, one might have been excused for looking upon them as representing a totally distinct form.

2. Descriptions of New Butterflies collected by Mr. F. J. Jackson, F.Z.S., in British East Africa, during his recent Expedition.—Part I. By EMILY MARY SHARPE.

[Received March 3, 1891.]

(Plates XVI. & XVII.)

This paper records the names of some new species of *Papilionidæ*, *Pieridæ*, and *Acraidæ* discovered by Mr. F. J. Jackson in the Kikuyu and Sotik districts and on Mount Elgon. I shall hope, later on, to give an account of the entire collection made by Mr. Jackson in these regions; but as it contains a number of *Lycanidæ*, this project will take some little time to accomplish, as the working out of the last-named family is a very difficult matter.

Subfam. PAPILIONINÆ.

1. PAPILIO MACKINNONI, sp. n. (Plate XVI. fig. 1.)

Nearest to *P. constantinus* of Ward, from Ribé (Afr. Lepid., part i. pl. i. figs. 1, 2), but easily distinguished by the position of the ochreous band across both wings, the absence of the submarginal row of yellow markings, and by the want of the large oval spot in the discoidal cell.

General colour rich brown, almost black, with all the spots and markings ochreous.

Fore wing. Hind margin scalloped with a half-circular edging of

ochreous between each nervule. From the costa, near the apex, is a row of nine ovate yellow spots forming a transverse band down to the inner margin, the spots distinctly separated from each other by a line of brown, marking each nervule; the spots on the disk below the radial and median nervules being much larger. Between the second and third subcostal nervules, and situated at the base of these two nervules, is a small hastate spot, smaller in size than in *P. constantinus* and nearly obsolete.

Hind wing. Similar to the fore wing in colour and markings, the transverse band of ochreous spots being continued in the same line as on the latter; the hind margin similarly scalloped with a fringe of ochre between the nervules, the tail being scalloped on the inside only.

The ochreous markings on the hind wing are more longitudinal in form than on the fore wing: those of the disk are in the form of longitudinally-ovate twin spots, between which is a scarcely visible line of brown; the spot near the anal angle very small and rounded.

Underside. Resembles the upper surface in general character of its colour and bands, but the transverse band on the hind wing is of a pearly appearance.

The general colour of the under surface is dark brown, but there are irregular mottlings of lighter brown on the basal area of the hind wing, causing the darker brown ground-colour to take the form of a band in continuation of the ochreous band, which does not extend higher than the second radial nervule.

Exp. $4\frac{1}{2}$ inches.

Hab. Between Sotik and Kavirondo, Oct. 1889.

The female is very similar to the male in colour, but the ochreous markings are larger, especially on the hind wing, where they form a broad band composed of entire (not twin) spots, which are obtusely oval towards the base of the wing and scalloped towards the hind margin.

Exp. $4\frac{1}{2}$ inches.

Hab. Kikuyu, August 1889.

2. *PAPILIO JACKSONI*, sp. n. (Plate XVII. figs. 1, 2.)

Nearest to *P. cynorta* of Fabricius, but differing in the white band of the fore wing, which, instead of being continuous with that of the hind wing, is broken up into spots.

General colour black, with white bands, spots, and markings.

Fore wing. Hind margin obsoletely scalloped with a white fringe between the nervules, a transverse row of eight spots slanting from the apex towards the inner margin, those between the radial and median nervules much smaller and more hastate in shape than in *P. cynorta*; the submedian spot of white consisting of a twin spot longitudinal in shape. Below the discoidal cell, the areas of the wing adjoining the nervules are marked by a shade of ashy brown, the texture of the wing at the same time being hirsute.

Hind wing. Hind margin distinctly scalloped with white between the nervules; a submarginal row of five white spots, rounded in

shape, four on the disk and one above the second subcostal nervule : the basal area somewhat browner and followed by a broad oblique transverse band of yellowish white.

Underside. Fore wing blackish, the transverse row of white ovate spots distinctly marked, but becoming obsolete towards the apex, where there is a distinct shade of ashy ; on the upper fore margin of the discoidal cell is an indistinct spot of white.

Hind wing light brown, darkening towards the apex and across the disk ; the white spots not so distinct as on the upper surface, the middle one of the five being obsolete ; between the second subcostal nervule and the radial nervule is an additional spot of white ; basal area rufous, with a spot and streak of black above the subcostal nervure ; the discoidal cell with three black lines ; the rufous base followed by a white band not so distinct as on the upperside of the wing, and shaded with lilac under certain lights.

Exp. 4 inches.

Hab. Between Sotik and Kavirondo, Sept. 1889.

The female is rather larger than the male, and is distinguished by the patch of rufous ochre which takes the place of the white transverse band of the male. There is a submarginal row of six white spots on the hind wing, instead of five as in the male. Instead of the band of longitudinal spots on the fore wing of the male, the female has a submarginal row of rounded white spots differing in size, five in number in a continuous series, confined to the disk, absent between the fourth and fifth subcostal nervules and between the latter and the first radial, but re-occurring between the third and fourth subcostal nervules near the apex. There are three irregular large white spots, one triangular on the upper margin of the discoidal cell, another below the cell, ovate in shape, between the first and second median nervules, and the third, a twin spot of irregular shape, at the base of the fifth subcostal and first radial nervules.

Exp. $4\frac{1}{4}$ inches.

Hab. Kikuyu, Sept. 1889.

This species is also nearly allied to *P. echerioides* of Trimen (*cf.* S. Afr. Butterfl. iii. p. 255), a species figured in the 'Transactions of the Entomological Society' for 1868 (p. 72, pl. vi. figs. 1, 2).

The position of the white spots on both wings is quite different, and both spots and bands are white, not yellowish white as described by Dr. Trimen.

Subfam. PIERINÆ.

3. MYLOTHRIS WINTONIANA, sp. n. (Plate XVI. fig. 2.)

Female. Similar to the female *M. clarissa* of Butler, and with a yellowish hind wing as in that species, but with a very much broader blackish border.

Fore wing white, the basal area pinkish ; costal margin and an oblique patch on the apex blackish, with four triangular spots on the hind margin diminishing in size towards the posterior angle, the spot at the end of the submedian nervure being very minute, those

at the end of the three median nervules becoming gradually larger, and the mark at the end of the radial nervules being confluent with the blackish apex.

Hind wing creamy ochreous, with a pinkish tinge on the basal area, the hind margin scalloped with a white fringe, before which a broad band of black, confluent at the end of the subcostal and radial nervules, and succeeded by a large rounded spot of black at the end of each median nervule. At the end of the submedian nervure is a small spot of black, the adjoining portion of the wing being shaded with orange.

Underside. Fore wing pearly white, rich orange at the base, and shaded with orange-yellow towards the apex, with a distinct row of black spots on the hind margin of the wing, and extending round the apex till they become evanescent on the costal margin.

Hind wing orange-yellow, a little deeper in colour near the base; the hinder margin with a row of large black rounded spots.

Exp. 4 inches.

Hab. Kavirondo, Oct. 1889.

4. MYLOTHRIS JACKSONI, sp. n. (Plate XVI. fig. 3.)

Nearest to *M. narcissus* of Butler (P. Z. S. 1888, p. 95), from Kilimanjaro, but differing in the broad black border, which extends along the inner margin to the base of the fore wing.

Fore wing white, with a complete black border all round, the base black, with a swollen area of black, extending from the base along the upper margin of the discoidal cell to the middle of the costal border, where the black costal margin is decidedly narrower; the border on the hind margin denticulated on its inner edge.

Hind wing bright sulphur-yellow, with tiny black spots marking the end of each nervule on the hind margin; and with a broad black streak, extending along the edge of the wing from the apex to about the end of the subcostal nervule.

Underside. Fore wing white, with the costal margin black, becoming yellow towards the apex, which continues yellow as far as the third median nervule. Each nervule is marked by a tiny black spot on the hind margin; these spots are more distinct on the hind wing, which is entirely sulphur-yellow.

Exp. $2\frac{3}{4}$ inches.

Hab. Kavirondo, Oct. 1889; Kikuyu, Aug. 1889.

5. MYLOTHRIS MACKENZIANA, sp. n. (Plate XVI. fig. 5.)

Nearest to *M. rueppelli* of Koch, but with no yellow at the base of the hind wing; the orange of the fore wing much more restricted and extending in an oblique patch across the basal third of the discoidal cell to the costal margin; the latter is black; there is no apical patch, but the costal margin shows two confluent black spots near the apex, and each nervule is marked with a tiny black spot on the hind margin as far as the first median nervule.

Hind wing white, with a tiny black spot at the end of each nervule on the hind margin.

Underside considerably different from that of *M. rueppelli*, the hinder wing and the apex of the fore wing being ochreous, each nervule being represented on the hind margin by a spot of black; the base of the fore wing with an oblique mark of bright orange as on the upper surface, but this orange mark is extended much further along the costal border and reaches beyond the limit of the discoidal cell.

Exp. $2\frac{3}{4}$ inches.

Hab. Kavirondo, Oct. 1889.

6. *TERACOLUS ELGONENSIS*, sp. n. (Plate XVI. fig. 6.)

General colour greenish white, with a small black spot at the end of the discoidal cell. The costal margin is narrowly edged with black, which is much broader at the apex, and continues along the hind margin, decreasing in width towards the submedian nervure, where the black terminates. Near the apex, between the third subcostal and first radial nervules, is an ovate spot of deep crimson followed by two other spots smaller in size, the last being nearly obsolete. At the base near the inner margin is a slight shading of grey. The hind wing is greenish white with no visible markings.

Underside. Fore wing white, with the costal margin, hind margin, and apical portion pale yellow, the small black spot at the end of the discoidal cell visible.

Hind wing entirely pale yellow, the costal margin narrowly edged with orange; a small streak of black is very distinct at the end of the cell; from the end of the costa to the submedian nervure is a half-circle of light brown spots between the nervules.

Exp. 3 inches.

Hab. Mount Elgon, Feb. 1890.

7. *BELENOIS MARGARITACEA*, sp. n. (Plate XVI. fig. 4.)

Fore wing with more than the basal half pearly white, the apical portion of the wing with the costal margin black, this black extending to the posterior angle but becoming much narrower in this direction. Some slight indications of subapical whitish streaks.

Hind wing pearly white with a bluish reflexion; the hind margin with a tolerably broad band of black indented by subterminal spots of bluish white, becoming smaller and more longitudinal between the first and second median nervules, and becoming obsolete above the submedian nervure.

Underside. Fore wing with the basal portion white, with a yellowish tinge, inclining to pale orange near the extreme base; costal margin and apical portion of the wing black, inclining to bronzy black at the apex and on the hind margin; this leaves a subterminal band of deeper black bordering the white area.

Hind wing bronzy black, with a spot of orange-yellow before the apex, and with a slight edging of yellow near the base of the costa; a slight indication of a paler subterminal shade of bronzy brown along the hind margin.

Exp. 2 inches.

Hab. Sotik, Sept. 1889.

Allied to *B. raffrayi* of Oberthür (*cf.* Études d'Entomologie, p. 17, pls. i. & iii.).

Subfam. ACRÆINÆ.

8. ACRÆA EXCELSIOR, sp. n. (Plate XVII. fig. 3.)

Of the same group as *A. bonasia*, but with a yellow subapical patch on the fore wing and a yellow patch on the hind wing. The underside differs from that of any species of *Acraea* which I have yet seen.

Fore wing. A large basal area of deep orange-rufous extending over two thirds of the cell and over all but the hind margin of the disc, so that it occupies the major portion of the wing. The base black, extending as a broad border along the costal margin to the apex, and round the hinder margin and along the inner margin, though here it is much narrower; where the rufous portion touches the black which borders it, there is a slight indication of a yellow intermediate line, near the costal margin and the outer posterior and inner marginal border. The subapical patch of pale yellow is tinged with rufous, and in shape is long and oval, extending from near the costal margin almost to the hind margin, crossing the base of the subcostal nervules and radial nervules almost to the posterior margin of the third median nervule. This yellow patch is separated from the rufous area by a black band from the costa to the hind margin.

Hind wing. Basal area black, with a rufous spot above the subcostal nervure; the centre of the wing crossed by a broad band of yellow, from the costa to the inner margin, washed with rufous towards the former and above the disk; the hind margin with a broad black band which occupies, at least, a quarter of the wing.

Under surface. More than the basal half orange-rufous, streaked with yellow at the base and along the costal margin, which is otherwise dusky black as well as the apex and hind margin of the wing, the latter narrowing towards the anal angle and ornamented with a mesial streak of crimson on the hinder margin between each nervule. A yellow subapical patch is enclosed by a band of black, exactly as on the upper surface.

Hind wing. Beautifully varied with yellow and crimson, the greater part of the wing being yellow. The base is crimson, enclosed in a triangular line of black, with a white spot at the base of the internal nervure. About the middle of the costal border is another triangular patch of crimson, enclosed by black, reaching to the hind margin of the discoidal cell. The hind margin of the wing is occupied by a broad border coequal with that of the upper surface, the nervules marked by a broad line of ashy black, the intervening spaces being crimson with a well-marked subterminal spot of white, the hind margin being fringed with black.

Exp. 2 inches.

Hab. Kikuyu, Sept. 1889.

9. *ACRÆA MELANOXANTHA*, sp. n. (Plate XVII. fig. 4.)

Black and yellow as in *A. circeis*, which it somewhat resembles, especially on the underside; it is, however, much smaller, and has fewer transparencies on the fore wing.

Fore wing black, with a double row of spots; two are twin-spots, one being at the posterior end of the cell, and the other adjoining it at the base of the disk, between the first and second median nervules. These two spots are irregularly oblong in shape and of a yellow colour. A second row of subapical spots consists of three, also irregularly oblong in shape, but transparent white; these are situated in juxtaposition, below the fifth subcostal and second radial nervules.

Hind wing blackish, with a patch of yellow, irregular in shape, occupying the middle of the wing. The basal area of the wing is black, extending in a black band along the costal margin, which joins the broad black border of the hind margin. The yellow colour of the hind wing reaches to the inner margin about its centre; the black nervules are indicated plainly as they cross the yellow area, and two black spots are also visible on the yellow of the upper margin of the discoidal cell.

Underside. Fore wing ashy brown for the basal two thirds, the white spot of the upperside indicated below, with a dusky spot at the base of the fifth subcostal nervule; apical area and hind margin of the wing coppery bronze, each interspace with a black mesial line, the nervules also marked out in black; the hind margin fringed with black.

Hind wing. Basal area ochreous yellow, deeper near the base, all this pale area numerously dotted with black spots, clustering nearer to the base and on the inner margin; hind margin with a broad band of coppery bronze, with the same mesial line of black and the black lines of the nervules also strongly indicated; the hinder margin fringed with black.

Exp. 2 inches.

Hab. Mount Elgon, Feb. 1890.

10. *ACRÆA OREAS*, sp. n. (Plate XVII. fig. 5.)

Resembling *A. melanoxantha* on the upper surface, with two rows of triple white spots, the subapical ones, however, not being transparent. The hind wing is further different in the yellow central patch being entirely shut in by black. The under surface, however, is totally different from that of *A. melanoxantha* and is more in the style of *A. cabira*.

Fore wing. Upper surface black, with two rows of oblong white spots: one row about the middle of the wing consisting of three dissociated spots, one in the middle of the cell, a second below the base of the second median nervule, and the third near the hind margin below the first median nervule. The second row of white

spots are subapical, two spots being close together below the fifth subcostal nervule, the second between the first radial, while the third is a little further off near the hind margin, below the second radial nervule.

Hind wing black, enclosing a large yellow area which reaches from near the base of the wing, spreads over the cell, and occupies the basal third of the disk.

Underside. Fore wing dusky, the apex somewhat reddish; the base buff chestnut, extending along the basal edge of the costal margin. The white spots of the upper surface indicated by pearly-white spots below.

Hind wing. Bright chestnut at the base, with tiny dots of black, followed by a yellow mesial area, almost coextensive with the same area on the upper surface, but reaching to the inner margin of the wing behind the chestnut, which has sharply quadrate borders on its hinder aspect; the whole of the hind margin bronzy brown with a reddish tinge, forming a very broad band, the nervules marked by black lines, with a mesial line of black between each nervule to the hind margin.

Exp. $2\frac{1}{4}$ inches.

Hab. Mount Elgon, Feb. 1890.

DESCRIPTION OF THE PLATES.

PLATE XVI.

- Fig. 1. *Papilio mackinnoni*, sp. n., p. 187.
 2. *Mylothris wintoniana*, sp. n., p. 189.
 3. *Mylothris jacksoni*, sp. n., p. 190.
 4. *Belenois margaritacea*, sp. n., p. 191.
 5. *Mylothris mackenziana*, sp. n., p. 190.
 6. *Teracolus elgonensis*, sp. n., p. 191.

PLATE XVII.

- Fig. 1. *Papilio jacksoni*, sp. n., ♂, p. 188.
 2. *Papilio jacksoni*, sp. n., ♀, p. 188.
 3. *Acræa excelsior*, sp. n., p. 192.
 4. *Acræa melanoxantha*, sp. n., p. 193.
 5. *Acræa oreas*, sp. n., p. 193.

3. On the Comparative Osteology of the United States *Columbidæ.* By R. W. SHUFELDT, C.M.Z.S.

[Received February 2, 1891.]

Opportunity has recently been afforded me to compare together examples of the skeletons of the following species of Pigeons of our avifauna, viz.:—*Ectopistes migratorius*, *Zenaidura macroura*, *Engu-
 ptila albifrons*, *Melopelia leucoptera*, *Columbigullina passerina*, *Scar-
 dofella inca*, and *Starnænas cyanocephala*. I have also had at hand during this work skeletons of several of our domesticated varieties, a large series of skeletons of nearly all our gallinaceous birds, and the published accounts of the osteology of many forms of columbine



